

What Would You Have Done?*

Time

two to three 45-minute periods

Vocabulary

aquatic, archaeological sites, channel, economic depression, erosion, glochidia, habitat, migration, mussel, non-point source pollution, point source pollution, pollutant, runoff, sediment, sedimentation, snag, terrestrial, water quality, watershed

Objective

Students will be able to evaluate the positive and negative effects of managing the Mississippi River for navigation.

Method

Students portray individuals representing differing perspectives and concerns related to a complex issue at a “public meeting.”

Materials

one copy of *Role-Playing Cards*, cut individually
copies of *The Situation at Hand* for each student
writing materials
paper

Background

The Mississippi River is very different now than when Marquette and Joliet traveled its waters. The transformation of the river began in 1866 when the Corps of Engineers created a four-foot navigation channel. Workers dredged, cleared overhanging trees, and removed other obstructions in the main **channel** (deeper part of a moving body of water where the main current flows) of the river. In 1872, the Corps pulled close to 1,300 **snags** (fallen trees) and cut 2,600 overhanging trees. One can only imagine the **habitat** (arrangement of food, water, shelter or cover, and space suitable to animals’ needs) those snags provided for the river’s **aquatic** (growing, living in, or frequenting water) life.

In 1878, Congress authorized creation of a 4½-foot channel to allow larger boats to travel upstream. This was done with wing dams (rock or wooden structures that come out perpendicular to the shore) and closing dams (dams that run from the shore to an island or from one island to another and eliminate the flow of water to backwaters during low water) to keep the flow of water in the main channel.

River traffic did not increase as was anticipated, so Congress authorized a six-foot navigation channel. More wing and closing dams were built and sand was dredged from the main channel. Even with the six-foot channel, navigation on the river was not up to the potential some people dreamed of.

In 1933, Congress authorized a nine-foot channel. The mandate created a series of locks and dams, acting like stair steps. This huge project was completed between 1934 and 1940. The locks and dams that we see on the Mississippi River today are from this project.

* Adapted with permission from the activity “The Great Dredging Decision,” Exploration of the Mississippi River Activity Guide, Jeff Janvrin, Wisconsin Department of Natural Resources, Wisconsin, 2002.

Many changes have occurred on the Mississippi River since Marquette and Joliet canoed its channel and backwaters. More **sediment** (fine soil and other particles that settle to the bottom of a liquid) travels down the Mississippi River now as compared to 1673 due to the large amount of agricultural and urban development in the river's watershed. Dams have slowed the flow of the river causing **sedimentation** (accumulation of sediment) to occur more quickly.

According to the Upper Mississippi River Basin Association, approximately 583 miles (69 percent) of the river has **water quality** (condition of water) problems. These vary from exceeding water quality standards for some **pollutants** (substances that may contaminate air, water, or soil), advisories on fish consumption, contaminated sediment, and state restrictions on swimming or fishing. These problems stem from numerous pollutants from the **watershed** (area of land that drains into a particular body of water) that contaminate the river.

Nonpoint source pollution (pollution which cannot be traced back to its origin) is a major source of water quality problems. This includes **runoff** (water that drains or flows off the surface of the land) from agricultural and urban lands, which can contain soil, pesticides, fertilizers, oil, and grease. Nonpoint source pollution is difficult to control because there is no single location where pollutants enter the river.

Point source pollution (pollution which can be traced back to its origin) can be a source of water quality problems as well. Point source pollution includes industrial discharges, wastewater treatment plant discharges, and overflow of sewer systems. Point source pollution is easier to identify and control. This type of pollution is regulated by a system of permits issued by states to control the concentration of pollutants allowed in the discharge of industries.

Some pollutants may be from a combination of present and past activities. The presence of PCBs in sediment, fish, and mayflies may be from past use of the substance. It also may be from a source not yet determined.

The water quality of the Mississippi River has improved through various methods of preventing pollution. States have created stricter and more comprehensive water quality standards. **Erosion** (removal or wearing away of soil or rock by water, wind, or other forces or processes) control programs like the Conservation Reserve Program (CRP), buffer strips, minimum till farming, terracing, and grassed waterways have reduced sediment entering the river.

While the Mississippi can be considered cleaner than what it was 30 years ago, it needs continuous commitment and expansion of programs to ensure progress continues. Despite the progress we have made, it will never return to the state Marquette and Joliet saw.

For more information on Marquette and Joliet's expedition on the Mississippi River, refer to *Iowa's Water*, page 1.

Procedure

1. Share information about the history of the Mississippi, Marquette and Joliet's expedition, the construction of the locks and dams, and the river's current status (see *background information*).
2. Provide students with *The Situation at Hand* information (either by reading it to them or giving them copies to read).
3. Discuss some of the possible costs and benefits of constructing a lock and dam system on a river from a variety of perspectives.
4. Distribute the cards from the *Role-Playing Cards* to the students. Create any additional roles that illustrate a variety of perspectives and interests.
5. Ask students to research their roles and to develop a short position paper for use in a presentation at the public meeting.

6. Arrange the room to represent a public meeting. Students role-play their positions and make presentations to the elected officials in the United States Congress. Congress will ultimately make a decision on the construction of the locks and dams.
7. After all students have made their presentations, ask the members of Congress to form a consensus plan that attempts to accommodate the various positions.
8. Following Congress's decision, have a brief class discussion to summarize the pros and cons that emerged from student presentations. Identify and list the benefits, if any, and the costs or liabilities, if any, as a result of the decision. Include effects on people, plants, and animals.
9. After the role-play and class discussion, ask each student to write a brief essay describing the student's personal historical recommendation for construction of the locks and dams on the Mississippi River. The students may expand their position papers in writing their essays.

Evaluation

1. What were the characteristics of the Mississippi River when Marquette and Joliet explored it? (flow, water quality, physical appearance, habitats, wildlife)
2. What are the characteristics of the Mississippi River now?
3. Name two or more possible benefits of the construction of locks and dams.
4. Name two or more possible negative consequences of the construction of locks and dams.
5. How has water quality of the Mississippi River been impacted since Marquette and Joliet explored the area?
6. Have fish and wildlife of the Mississippi benefited or been harmed by the changes people have made to the River? Explain. (Some species are more abundant, others are less abundant, some are threatened or endangered.)

Extensions

Attend a public meeting in your community.

Research bodies of water in your community. Were there public works projects done on or around them in the 1930s or 1940s? Why were these projects done? How have they affected the water body? The local community?

Research the Civilian Conservation Corps (CCC). Did CCC members work in your county? If so, what was their project? Has it affected water quality? How?

Teacher Aids

Posters

- "Aquatic Life." Ill. Brian Wignall. 1989. Des Moines: Iowa Department of Natural Resources' Aquatic Education Program.
- "Benthic Macroinvertebrates." Ill. SB Lauterbach. Des Moines: Iowa Department of Natural Resources' Aquatic Education Program.
- "Fish Iowa! Fish Posters." Ill. Maynard Reese. 1994. Des Moines: Iowa Department of Natural Resources' Aquatic Education Program.
- "Life in a Stream." Ill. Brian Wignall. 1989. Des Moines: Iowa Department of Natural Resources' Aquatic Education Program.

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- "Biodiversity of Iowa: Aquatic Habitats." 2001. Des Moines: Iowa Department of Natural Resources' Aquatic Education Program.
- "Canaries of the Deep, The Plight of the Fresh Water Mussel." 2003. Geode Resource Conservation and Development Incorporated.
- "Living Landscape." Conservation Technology Information Center.

What Would You have Done: Role-Playing Cards

Bing Button: owner of a local button manufacturing plant – concerned about the impact locks and dams will have on mussel populations

New Deal: President of the United States – worried about unemployment of many of his citizens

Un M. Ployed: local man without job – seeks employment with the construction of locks and dams

T. X. Payer: U.S. citizen – concerned about government spending

Woody Duck: waterfowl hunter – likes current habitat for ducks, geese, and other water birds

Musk E. Lunge: Fish and Wildlife Service – concerned about the lock and dams' impacts to fisheries

Marge Barge: owner of barge company – wants to have the river deep enough for navigation

Tired O'Wadin: Corps of Engineers Supervisor – wants a more efficient system to assist in navigation

Art I. Fact: archaeology buff – concerned the pools created by locks and dams will flood the sites of Native American villages and burial mounds

T.M. Burr: owner of lumber company – land will be inundated by the pools from the dams

Muss Elman: mussel harvester – concerned about effects of sedimentation on mussels

E. Conomy: area business person – wants to see transportation on the river to bring more people and supplies to his town

Com R. Us: prominent business person – would like to see the river used as the navigation tool it could be

Foss L. Fuel: local coal miner – would like to transport coal down the river

E. Lected: Mayor of area town – hopes the construction of locks and dams will bring jobs and money to the town

Col. C. L. Over: Coast Guard – concerned the channel will be deep enough for safe passage of vessels

O. MacDonald: Iowa farmer – wants more efficient method of transporting grain

I. Ketchum: commercial fisherperson – does not want prime fishing spots to be affected by dredging and construction

O.L. Coot : Iowa Conservation Commission Wildlife Biologist – concerned about the impacts flooding will have on waterfowl

Also E. Lected: U.S. Senator – wants to fund large public construction projects to put citizens to work

John Trapper: area trapper – concerned about the dam's impacts to furbearers

M. O. Mearth: Soil Conservation Service – concerned about erosion during the construction of the dams

H.M. Owner: owner of house in river bottoms – doesn't want house to be flooded by the dams

Polly Tishin: U.S. Representative – wants to fund large public construction projects to put Americans at work

The Situation at Hand

It is 1933. The false prosperity of the 1920s has disappeared and the American people are left with the harsh reality of life during an **economic depression** (period of time where there is an economic downturn usually accompanied with high unemployment, loss of value of currency, and lower stock values). More than 10 million Americans are unemployed. Franklin Roosevelt recently took office with a plan to get Americans back to work.

This plan, a.k.a. the “New Deal,” will use government money to create jobs for citizens. One of the proposed projects involves the creation of the locks and dams system on the Mississippi River.

Quick Facts

- ✿ The locks and dams will create a nine-foot channel from St. Louis, Missouri to St. Paul, Minnesota.
- ✿ The Upper Mississippi River has been known for the troublesome snags, sandbars, and rapids that create havoc for river travelers.
- ✿ The system will take approximately six years to create and will employ thousands of workers. After construction, hundreds of employees will be needed to operate the facility.
- ✿ Some estimates say the project will cost as much as 164 million dollars.
- ✿ Many economists project a growth in the local and national economy due to the expansion of trade.
- ✿ Water quality will be affected by increased sedimentation due to decreased rate of flow from the dam’s blockage of water.
- ✿ Wildlife would be affected by:
 - Loss of **terrestrial** (living or growing on land) habitat from flooding the valleys.
 - Blockage of the **migration** (the periodic movement of animals from one area to another and back again as a natural part of their lives) of fish due to the creation of locks and dams.
 - Reduction of migratory fish species (skipjack herring, paddlefish) adapted to free flowing waters.
 - Increase in warmer, nonflowing water habitat resulting in an increase in crappie, bluegill, largemouth bass, and other fish tolerant of these conditions.
 - Great increase in backwater habitat initially due to its expansion.
 - Decrease in the habitat for waterfowl due to the elimination of seasonal flow which allows their food (aquatic plants) to grow.
 - Decrease in the amount of **mussels** (mollusks that have two shells and are collector-filterers) due to increased sedimentation and the loss of migrating fish to transport their **glochidia** (young).
- ✿ Other Impacts
 - American Indian **archeological sites** (a place where material remains of past peoples are found) will be flooded.
 - Houses and towns located near the river will be flooded.